

Sept. 30, 1969

J. DE ROBERTIS ET AL

3,470,334

MULTICONTACT SWITCH

Filed April 11, 1968

2 Sheets-Sheet 1

FIG. 1

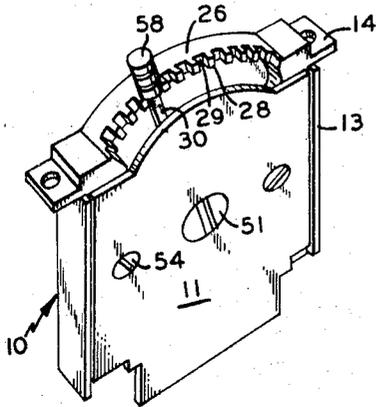


FIG. 2

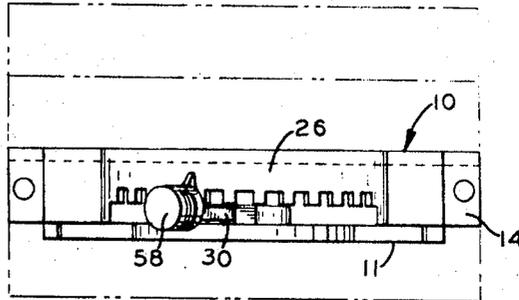


FIG. 3

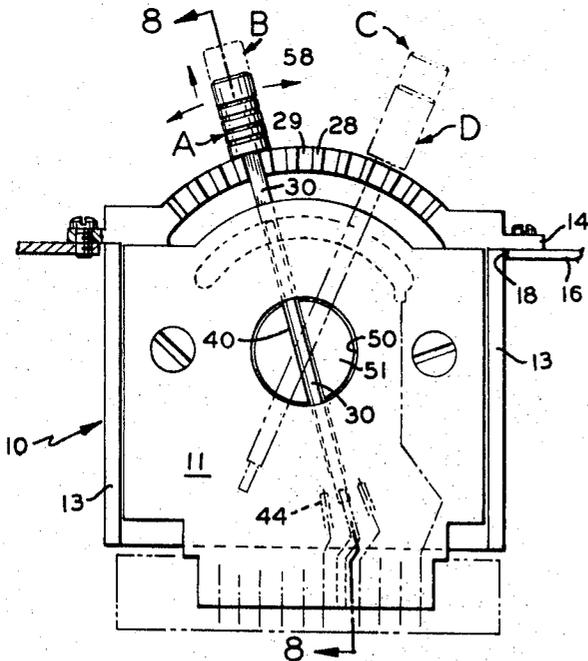
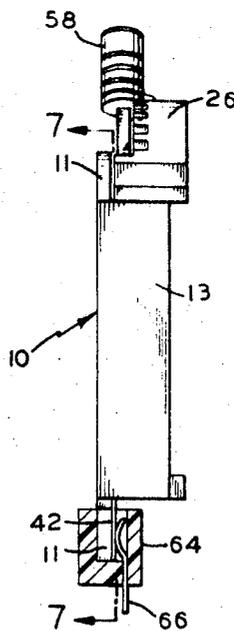


FIG. 4



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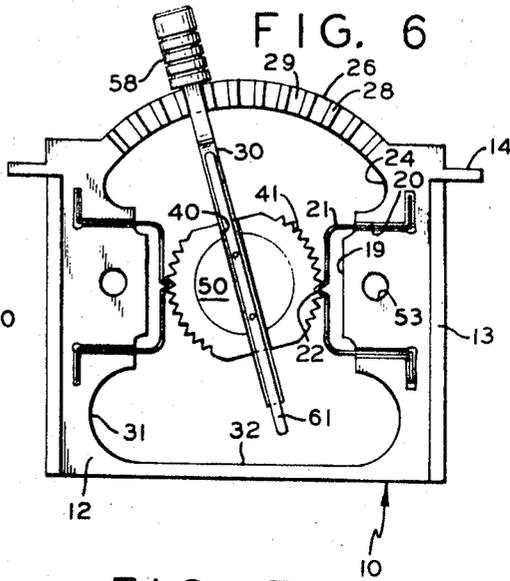
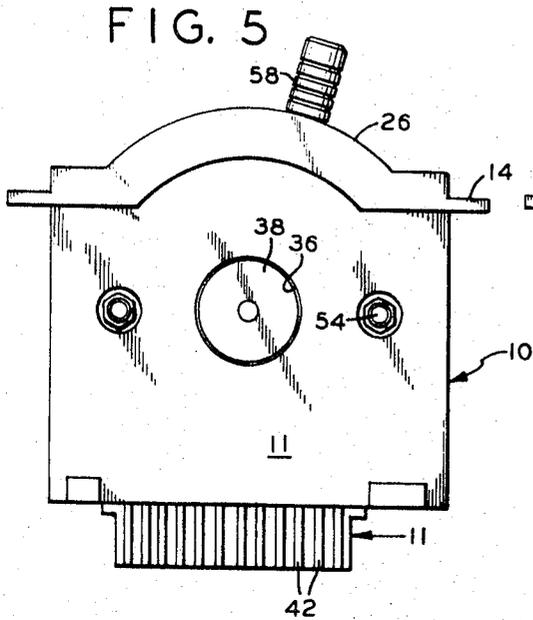


FIG. 8

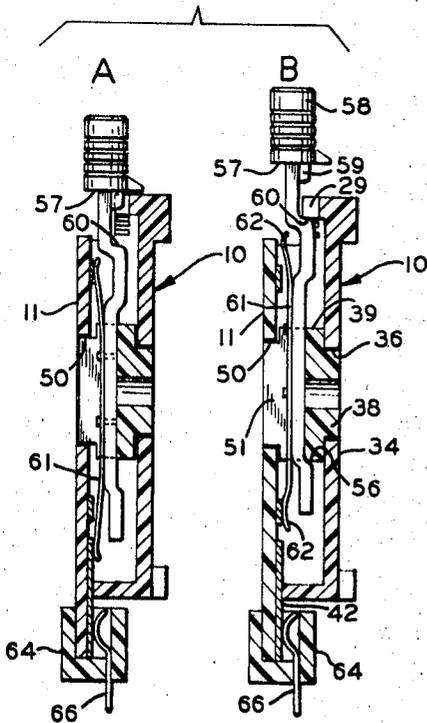
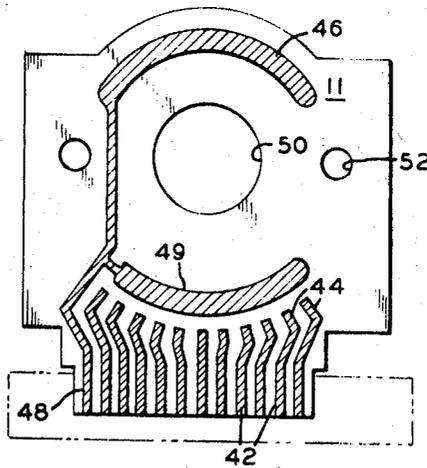


FIG. 7



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MULTICONTACT SWITCH

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Int. Cl. H01h 19/58, 21/78

U.S. Cl. 200—11

5 Claims

ABSTRACT OF THE DISCLOSURE

A switch of the kind used in rheostats with a pivoted lever and a plurality of contacts successively engaged by the lever slidably mounted on a slot in a rotatable carrier wherein the arm is longitudinally movable a short distance between two positions defined by stops. In a first position, one of several circuits is established and so long as the lever is in this position, it cannot be rotated. When the lever is moved longitudinally the other position, preparatory to rotating the lever to establish another circuit, the first circuit is opened, and all circuits remain open until the lever is again moved to the desired position.

This invention relates to circuitry or switching systems and has for its principal object the provision of means for selectively connecting one of many circuits to another circuit by manual means and no circuits are connected at any time during movement of the switch lever from one circuit to another. The switch of the present invention is intended to replace thumb-wheel switches which are electrically bridging during movement from one position to another. This is not desirable in many switching applications. This non-bridging feature could, of course, be accomplished by simply providing another switch to cut the thumb-wheel circuitry during movement of the wheel. The results of such an arrangement would be uncertain at best.

SUMMARY OF THE INVENTION

The present switch provides a switch arm slidably mounted in a slot in a rotatable carrier wherein the arm is longitudinally movable a short distance between two positions defined by stops. In a first position, one of several circuits is established and so long as the lever is in this position, it cannot be rotated. When the lever is moved longitudinally the other position, preparatory to rotating the lever to establish another circuit, the first circuit is opened, and all circuits remain open until the lever is again moved to the desired position.

In the drawings:

FIG. 1 is a perspective view of the switch of the present invention;

FIG. 2 is a top plan view thereof and showing in broken lines the arrangement for stacking the switch units in side-by-side relation;

FIG. 3 is a front elevation of the switch with the levers in position A-D;

FIG. 4 is an elevation of the right hand side of the switch shown in FIG. 3;

FIG. 5 is a rear elevation of the switch;

FIG. 6 is a front elevation with the etched circuit removed;

FIG. 7 is an elevational view of the inside of the etched circuit taken on the line 7—7 in FIG. 4;

FIGS. 8A and 8B are vertical sections through the switch with the lever in the positions of 8A and 8B, the sections being taken on line 8—8 of FIG. 3.

The switch of the present invention includes a housing 10 and a plate 11 which forms an etched conductor card.

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The housing is preferably molded or cast in one piece from insulating material and has on its inner face 12 opposed vertical flanges 13 which receive the etched circuit plate in snug-fit relation. It further has opposed horizontal flanges 14 at the upper ends of flanges 13 which may be secured to the upper edge of a panel 16 having an opening 18 to receive the switch.

The housing has a recess 19 extending inwardly from its inner face 12 and slots 20 extending outwardly from the recess receive detent springs 21, which may be cemented therein and which have central V-shaped detent 22. The recess has wider curved sections 24 at its upper end. A curved upper edge 26 of the housing is characterized by spaced, outwardly projecting fingers 28 leaving slots 29 between each pair. A selector lever 30 is pivotally mounted between its ends within the housing and at its upper end projects above the housing. This lever has a portion which is received in one of these slots and is thus locked against movement. The lower end of the housing recess is wider, defined by opposed curved edges 31 and a long lower edge 32.

The outer wall 34 of the housing has a central opening 36 which receives a bearing section 38 of a rotary carrier 39 for the lever 30, the carrier having a central through slot 40 to receive and support the lever. The outer periphery of the rotary lever carrier has opposed notched sections providing notches 41 which receive the opposed detents 22 and hold the carrier and the lever in a selected, fixed position.

The plate 11 which forms a closure for the housing and whose inner surface forms the conductor card is made from insulating material. It has a plurality of contacts 42 imprinted or etched thereon whose upper ends 44 are arranged in an arcuate pattern. It also has an upper curved contact section 46 arranged to be connected to any one of contact members 42 and having a lower terminal 48 extending down the side of the card. It also has a curved contact section 49 connected therewith below the center. Finally, it has a central opening 50 to receive a reduced section 51 of the rotary carrier and forming a second bearing element therefor, and a pair of holes 52 aligned with holes 53 in the housing to receive bolts 54 of any given length to mount a plurality of the units in side by side relation or to secure the etched circuit plate if only one unit is used.

The switch lever 30 is formed from a strip of metal of a width to be received for free sliding movement in slot 40 from a first or lower position where a desired circuit is established, to a second or upper position, where all circuits are open.

The lever has near its lower end an offset portion forming a shoulder 56 providing a stop when a finger piece 58 secured at the upper end of the lever is pulled upwardly to the second position, preparatory to rotating the lever to establish a different circuit. This finger piece has a projection 59 which enters one of slots 29 when the lever is moved downwardly to the position of B in FIG. 8. When this projection enters one of the slots 29, the lever is locked against movement. The lower face 57 of the finger piece also acts as a stop limiting downward movement of the lever when it reaches the position shown at A in FIG. 8. The lever also has an upper offset section forming a shoulder 60, which cooperate with shoulder 56, limiting upward movement of the lever. Contact is made between one of contacts 42 and arcuate contact strip 46, by a flat spring 61 secured to the inner face of the lever and having outwardly bent terminals 62 which resiliently engage these contacts.

Any suitable means may be provided for effecting electrical connections with the individual contact strips 42. In FIG. 4, this is shown comprising a channel 64 of in-

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ulating material which carries spring contact members 66, one for each contact strip 42 and the channel can be cemented in place.

The references herein and in the appended claims to upper and lower are made only for the purposes of consistency with the figures in the drawings and are not used in any limiting sense.

While there have been described herein what are at present considered preferred embodiments of the invention, it will be obvious to those skilled in the art that many modifications and changes may be made therein without departing from the essence of the invention. It is therefore to be understood that the exemplary embodiments are illustrative and not restrictive of the invention.

We claim:

1. A switch including a housing and a removable plate providing a closure for the housing and forming on its inner surface an etched conductor card provided at its lower end with a plurality of radially disposed spaced contacts and at its upper end with a single elongated arcuate contact to be connected to a desired one of the radial contacts, a rotatable switch lever for effecting such connection between the upper and lower contacts, and a switch lever carrier rotatably mounted in the housing and supporting the lever, said lever being slidable from a lower to an upper position with stops limiting such movement, a projection on the lever, the housing having slots extending over its top wall, one of which receives the projection when the lever is in the lower position, preventing further rotation of the lever, a resilient contact strip carried on the lever for connecting a radial con-

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tact with the arcuate contact when the lever is in the upper position, movement of the lever to the lower position opening any established circuit and permitting rotation of the lever to establish a different circuit.

2. The structure recited in claim 1 wherein the switch lever carrier has a slot to receive the lever in sliding relation.

3. The structure recited in claim 2 wherein the carrier has notches along opposed edges and spring detents carried by the housing resiliently engage some of said notches.

4. The structure recited in claim 1 wherein the housing and the plate have aligned bearing openings receiving the switch carrier.

5. The structure recited in claim 1 wherein the housing and plate have aligned opening to permit a plurality of the switch units to be mounted in side-by-side relation with a mounting bolt extending through said openings.

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J. R. SCOTT, Assistant Examiner

U.S. Cl. X.R.

200—17, 155, 172